Introduction to AI
Solutions to exercises at week 12

Ex. 1 Assume Bob's belief set $B = Cn(\{p, p \leftrightarrow q, \neg r\})$. Come up with an appropriate prior plausibility order on W (the set of all possible truth assignments over p, q, r) which will satisfy the given requirements.

Solution:

p, q, r	$p, q, \bar{r}$	$p, \bar{q}, r$	$p, \bar{q}, \bar{r}$	$\bar{p}, q, r$	$\bar{p}, q, \bar{r}$	$\bar{p}, \bar{q}, r$	$\bar{p}, \bar{q}, \bar{r}$
a			d	e	f	g	h
		c					
	b						

Table 1: An example of a prior plausibility

1. After revision with r Bob would believe that $\neg q$: after revision with r the minimal world becomes c, and $\neg q$ is true in c.
2. After contraction with $p \rightarrow q$ Bob would believe that p: after contraction with $p \rightarrow q$, c is the minimal world which does not satisfy $p \rightarrow q$, since p is true in c and q is false in c. Note that, $p \in B \div (p \rightarrow q)$ because p is true in both b and c.

Ex. 2 Let $A = \{p, q, p \wedge q, p \vee q, p \rightarrow q\}$ be a belief base. Which of the following sets are elements of $A \perp q$?

Solution:

set of formulas	yes	no
$\{p, p \vee q\}$	x	
$\{p \rightarrow q\}$	x	
$\{p \vee q, p \rightarrow q\}$		x
$\{p \vee q\}$		x

Ex. 3 Give an example (different than the one presented in Lecture 11) of two belief bases that are statically equivalent (i.e., they generate the same belief sets), but are not dynamically equivalent.

Solution: For instance, two belief bases $A = \{p, p \rightarrow q\}$ and $B = \{p, q\}$. $Cn(A) = Cn(B)$, but $Cn(A * \neg p) \neq Cn(B * \neg p)$.